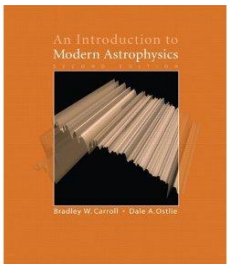
Fall 2018

PHYS 320-001: Astronomy and Astrophysics I

Dale Gary

PHYSICS 320, ASTRONOMY AND ASTROPHYSICS I
COURSE OUTLINE (Fall 2018)

Text for the course



Introduction to Modern Astrophysics
(2nd Edition)
by
Carroll & Ostlie

Time/Location: 10:00–11:25 am T, R; 111 Cullimore
Instructor: Prof. Dale E. Gary
Office: 101 Tiernan; Office hours: 2:30 pm - 4 pm, Mon
Phone: (973) 642-7878
E-Mail: dgary@njit.edu
Web Page: http://web.njit.edu/~gary/320

- **Readings:** The reading assignments are listed below. For this course, we will be covering Chapters 1, 2, 3, 6, 11, 12, 19, 20, 21, 22 and 23. Complete the readings **before** the corresponding lectures.
- **Homework:** The homework assignments will be collected on each Thursday.
- **Exams:** There will be two in-class exams during the semester, and the final exam.
- **Grades:** Your grade will be based on your homework (20%), in-class exams (30%), attendance and class participation (20%), and final exam (30%).
- **Observing Sessions:** Two *optional* observing sessions in the observatory on the roof of Faculty Hall will be held during the semester. If possible, we will plan a trip to the Dreyfuss Planetarium at the Newark Museum.

Here are the approximate weights to be used for calculating the final grade and the final grade scale:

30% for the two common exams (15% each)	85% and more	A
30% for the final exam	80% - 84%	B+
20% for the total homework grade	70% - 79%	B
20% for total attendance/class participation	65% - 69%	C+
	55% - 64%	C
	50% - 54%	D
	49% and less	F

Grades are not negotiable. A score of 84.99999% is a B+, not an A

Lecture Number and Title	Reading Assignment	Homework Assignment
Lecture 1 (*T 09/04*). Introduction to the Solar System	Earth as a Peppercorn (web page)	Due 09/13: Homework given in lecture
Lecture 2 (*R 09/06*). Solar System From Earth: Positions in the Sky	Chapt 1, Download and install the free program Stellarium (Stellarium web page)	Due 09/13: Ch 1, Probs. 1.3, 1.4, 1.5 (but do this for Newark's latitude), 1.8
Lecture 3 (T *09/11*). Kepler's Laws	Chapt 2, Section 2.1 (Article from Physics Today)	Due 09/20: Ch 2, Prob. 2.2, Mercury Problem
Lecture 4 (R *09/13*). Newtonian Mechanics	Ch 2, Section 2.2	Due 09/20: ISS and Jupiter Problems
Lecture 5 (*T 09/18*). Telescopes and Detectors	Chapter 6, Section 6.1, 6.2	Due 09/27. Ch 6, Probs. 6.2, 6.9 (PDF Pages) Solar Eclipse Problem
Lecture 6 (*R 09/20*). Star Distances and Magnitudes	Chapter 3, Section 3.1, 3.2, 3.4, 3.6	Due 09/27. Ch 3, Lecture6_HW
Lecture 7 (*T 09/25*). Orbital Mechanics	Ch. 2, Sections 2.2, 2.3. Sky Live 3D Solar System	Due 10/04: Ch 2, Prob. 2.13, 2.14 (but for prob. 2.14, instead of Comet Halley, answer using the object 2002 VE68, whose period is 224.82 days and eccentricity is 0.41), Lecture07_HW,
Lecture 8 (*R 09/27*). Interstellar Medium	Chapter 12, Sections 12.1	Due 10/04: Ch. 12, Probs. 12.4, Lecture 8 problems

Lecture 9 *(T 10/02)*. Protostar Formation	Chapter 12, Section 12.2	Due 10/12: Ch. 12, Probs. 12.17, Lecture 9 problems
(*R 10/04*). ***Test on Mechanics and Orbits (Study Guide) Rm: 210 Kupfrian***	Chapters 1,2,3,6 Equation Sheet	
Lecture 10 *(T 10/09)*. Search for Extrasolar Planets	Chapter 7, Section 7.4, Chapter 23, Section 23.1	Due 10/19: Ch. 23, Probs. Lecture 10 problems
Lecture 11 *(R 10/11)*. Formation of Planetary Systems	Chapter 23, Section 23.2	Due 10/26: Ch. 23, Probs. 23.5, 23.9, Lecture 11 problem
Lecture 12 *(T 10/16)*. Physical Processes of the Solar System: Tidal Effects	Chapter 19, Sections 19.1-19.2	Due 10/26: Ch. 19, Probs. Lecture 12 problems
Lecture 13 *(R 10/18)*. Physical Processes of the Solar System: Atmospheres	Chapter 19, Sections 19.3	Due 11/02: Ch. 19, Probs. Lecture 13 problems

Lecture Number and Title	**Reading Assignment**	**Homework Assignment**
Lecture 14 *(T 10/23)* Mercury	Chapter 20, Sections 20.1, 20.4 (see also 19.3)	Due 11/02: 20.2, 20.5, Lecture 14 problem
Lecture 15 *(R 10/25)*. Venus, Earth, Moon	Chapter 20, Sections 20.2-20.4	Due 11/09: 20.8, 20.9
Lecture 15 *(T 10/30)*. Venus, Earth, Moon	Chapter 20, Sections 20.2-20.4	Due 11/09: 20.8, 20.9
(*R 11/01*) ***Test on Formation of Planetary Systems (Study Guide) Rm: 210 Kupfrian***	Chapters 12, 19, 23	
Lecture 16 *(T 11/06)*. Mars (check out this image of the day)	Chapter 20, Section 20.5	Due 11/16: None
Lecture 17 *(R 11/08)*. Giant Planets	Chapter 21, Sections 21.1, 21.3	Due 11/21: Lecture 17 problems
Lecture 18 *(T 11/13)*. Saturn, Moons and Rings	Chapter 21 , Sections 21.2, 21.3	Due 11/21: None
Lecture 19 *(R 11/15)*. Moons and Rings of the Other Giant Planets	Chapter 21, Section 21.2	Due 11/30: Lecture 19 problems
Lecture 20 *(T 11/20)*. Pluto, Kuiper Belt Also, presentation by Mohamed Miraoui on Pluto.	Chapter 22, Sections 22.1-22.2	Due 12/07: None
Lecture 21 *(T 11/27)*. Asteroids, Comets and Meteors ppt file Lecture html	Chapter 22, Sections 22.3-22.4 Podcast (mp3 file)	Due 12/07: 22.8, 22.10 Lecture 21 problem
Lecture 22 *(R 11/29)*. The Sun	Chapter 11, Sections 11.1-11.2	Due 12/12: Lecture 22 problems
Lecture 23 *(T 12/04)*. Solar Activity	Chapter 11, Section 11.3	Due 12/12: Lecture 23 problems
Lecture 24 *(R 12/06)*. Interplanetary Space and the Heliosphere	Chapter 11, Section 11.2	
Lecture 25 *(T 12/11)*. Life in the Solar System	None	
Lecture 26 *(skip)*. Review ***(Study Guide)***	None	

12/21 Final Exam (Study Guide)	***Chapters 1, 2, 3, 6, 11, 12, 19-23 (Rm 100 ECEC)***